

What is claimed is:

1. An Ethernet Optical Area Network ("EOAN"), comprising:

a fiber optic ring;

5 a plurality of user facilities coupled to the fiber optic ring, wherein each of the user facilities is coupled to the fiber optic ring via an optical switch and an Ethernet switch, wherein one or more of the user facilities is coupled to the Ethernet switch via a microwave or free space optic transmission system;

10 a network operation center ("NOC") coupling data to and from the fiber optic ring, wherein the NOC is coupled to the fiber optic ring via an optical switch and an Ethernet switch, wherein the NOC includes a network management application for managing the EOAN by managing the optical switches and the Ethernet switches coupling the user facilities and the NOC to the fiber optic ring;

15 wherein data communications are provided between various user facilities coupled to the fiber optic ring including one or more user facilities coupled via a microwave or free space optic transmission system using an Ethernet protocol.

2. The EOAN of claim 1, wherein the NOC sends network management commands to the optical switches and Ethernet switches coupling the user facilities and the NOC to the fiber optic ring.

20 3. The EOAN of claim 2, wherein the network management commands comprise SNMP commands.

4. The EOAN of claim 2, wherein the network management commands allocate bandwidth between types of data communications over the fiber optic ring.

5. The EOAN of claim 4, wherein voice communications are given a higher priority for data transmission over the fiber optic ring as compared to computer data communications.

25 6. The EOAN of claim 5, wherein a predetermined level of Quality of Service (QoS) is provided for voice communications over the fiber optic ring.

7. The EOAN of claim 1, wherein data is transmitted through the fiber optic ring using a plurality of wavelengths of light, wherein each wavelength provides a channel for data transmission via the fiber optic ring.

8. The EOAN of claim 7, wherein the fiber optic ring comprises a wavelength division multiplexing (WDM) or dense wavelength division multiplexing (DWDM) fiber optic ring.

9. The EOAN of claim 8, wherein data communications for a plurality of users is provided at least in part by assigning one or more of the channels for data transmission to one or more particular users.

10. The EOAN of claim 9, wherein at least a first user is assigned a predetermined channel of the plurality of channels, wherein data communications for the first user are transmitted over the fiber optic ring using the predetermined channel.

11. The EOAN of claim 10, wherein data communications for only the first user are transmitted over the fiber optic ring using the predetermined channel.

12. The EOAN of claim 10, wherein at least a second user is not assigned to any single predetermined channel of the plurality of channels.

13. The EOAN of claim 12, wherein data communications for the second user are segregated from other users via frame tags.

14. The EOAN of claim 1, wherein data communications from a first user facility to a second user facility are routed to the NOC via the fiber optic ring and subsequently routed to the second user facility from the NOC via the fiber optic ring.

15. The EOAN of claim 1, wherein voice data communications are transmitted via the fiber optic ring, wherein a particular voice data communication is transmitted from a first user facility to the NOC via an Ethernet protocol, wherein the NOC processes the particular voice data communication in accordance with a telecommunications protocol, wherein the NOC transmits the particular voice data communication to a telephone company central office, wherein the telephone company central office connects the particular voice data communication to a remote user facility.

16. The EOAN of claim 15, wherein the NOC transmits the particular voice data communication to the telephone company central office via a communication facility separate from the fiber optic ring.

17. The EOAN of claim 15, wherein the NOC transmits the particular voice data communication to the telephone company central office via the fiber optic ring.

18. The EOAN of claim 17, wherein data is transmitted through the fiber optic ring using a plurality of wavelengths of light, wherein each wavelength provides a channel for data transmission via the fiber optic ring, wherein one or more predetermined channels for data transmission are dedicated for communications with the telephone company central office via the fiber optic ring.

19. The EOAN of claim 18, wherein at least a first channel for data transmission via the fiber optic ring is dedicated for communications with the telephone company central office via a telecommunications protocol, wherein at least a second channel for data transmission via the fiber optic ring is dedicated for communications between user facilities or other facilities coupled to the fiber optic ring via an Ethernet protocol.

20. The EOAN of claim 1, wherein the EOAN comprises a plurality of fiber optic rings that are interconnected.

21. The EOAN of claim 20, wherein at least a first fiber optic ring is interconnected with a second fiber optic ring, wherein the first fiber optic ring is coupled to user facilities and other facilities in a first municipality, and wherein the second fiber optic ring is coupled to user facilities and other facilities in a second municipality.

22. The EOAN of claim 21, wherein a NOC coupled to the first fiber optic ring controls routing of data communications via the first and second fiber optic rings.

23. The EOAN of claim 21, wherein data communications occur within and between the first and second municipalities in accordance with an Ethernet protocol.

24. The EOAN of claim 20, wherein the first fiber optic ring is interconnected with the second fiber optic ring via a common NOC, a long-haul fiber connection, a microwave-based connection, or a free space optic connection.

25. The EOAN of claim 1, wherein a first user transmits data to the fiber optic ring at least in part using a free space optic data transmission, wherein a second user transmits data to the fiber optic ring at least in part using a microwave data transmission, wherein a third user transmits data to the fiber optic ring at least in part using a fiber optic data transmission but not a free space optic data transmission or a microwave data transmission.

26. The EOAN of claim 25, wherein the first user, second user and third user are geographically remote from each other, wherein data communications from and among the first user, second user and third user are in accordance with an Ethernet protocol.

27. The EOAN of claim 1, wherein the fiber optic ring comprises one or more pairs of fiber optics, wherein a first fiber of at least one pair of fibers transmits data in both directions around the fiber optic ring, wherein a second fiber of the at least one pair of fibers transmits in both directions around the fiber optic ring opposite the first direction.

28. The EOAN of claim 27, wherein data transmissions may occur via the first direction or the second direction, wherein a redundant path for data transmissions via the fiber optic ring is provided.

29. The EOAN of claim 27, wherein the fiber optic ring comprises a self-healing fiber optic ring.

30. The EOAN of claim 1, wherein the EOAN comprises first and second NOCs, wherein the second NOC is a redundant NOC and manages the EOAN by managing the optical switches and the Ethernet switches if the first NOC is unavailable.

31. A method for managing data transmissions via an Ethernet Optical Area Network ("EOAN") via a fiber optic ring and a network operation center ("NOC") coupling data to and from the fiber optic ring, wherein the NOC is coupled to the fiber optic ring via an optical switch and an Ethernet switch, the method comprising the steps of:

transmitting first user data to the fiber optic ring at least in part using a free space optic data transmission, wherein the first user data is transmitted via the fiber optic ring to the NOC in accordance with an Ethernet protocol;

transmitting second user data to the fiber optic ring at least in part using a microwave data transmissions, wherein the second user data is transmitted via the fiber optic ring to the NOC in accordance with an Ethernet protocol;

5 transmitting third user data to the fiber optic ring at least in part using a fiber optic data transmission but not a free space optic data transmission or a microwave data transmission, wherein the second user data is transmitted via the fiber optic ring to the NOC in accordance with an Ethernet protocol;

routing the first user data, the second user data and the third user data via the NOC;

10 wherein the NOC includes a network management application for managing the EOAN by managing optical switches, Ethernet switches, free space optic transmission systems, microwave transmission systems, and other transmission devices that control transmission of user data via the fiber optic ring;

wherein data communications are provided between various user facilities and other facilities coupled to the fiber optic ring using an Ethernet protocol.